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Sound waves in liquids with polydisperse vapor-gas and gas bubbles

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Abstract

© 2015, Pleiades Publishing, Ltd. A mathematical model determining the propagation of sound waves in the two-fraction mixture of a liquid with polydisperse vapor-gas and gas bubbles with account of phase transformations is presented. The system of integro-differential equations governing the disturbed flow of the two-phase mixture is written, the dispersion equation is derived, and the equilibrium speed of sound is determined. The equilibrium speed of sound is shown to decrease with increase in the vapor concentration. The theoretical predictions are compared with the available experimental data on the phase velocity in the water with vapor bubbles and in the mixture of freon with vapor bubbles.

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Keywords

bubbly liquids, dispersion equation, mass transfer, sound waves